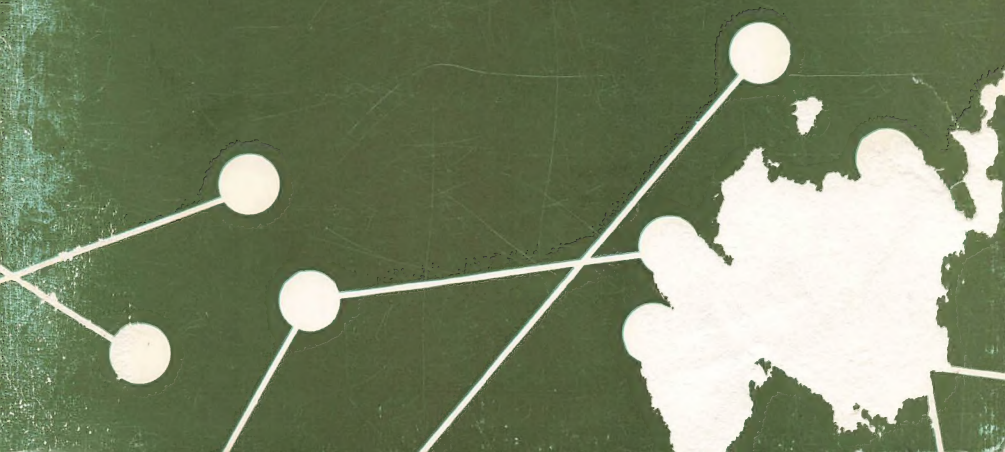


SCIENTISTS WHO BELIEVE

Ten interviews with Christian men of science



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SCIENTISTS WHO BELIEVE

*Ten Interviews
with
Christian Men
of
Science*

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Foreword

Do the Bible and the sciences conflict? What does a scientist who believes the Bible think of Darwin's theory of evolution? What makes man different from the higher animals? What does science have to offer to the Church? Does the Church speak effectively to scientists?

These and other questions have been asked for one hundred years or more. The relationship of the Church to the sciences has been strained at times, but now seems to be reaching friendly status, as indicated by an organization such as the American Scientific Affiliation, which includes some of the men whose interviews are contained herein besides other Christian scientists who believe the Bible.

The scientists who speak in the following pages discuss the questions above as well as others put to them in personal interviews by James C. Hefley, a Southern Baptist minister and a member of the David C. Cook editorial staff.

Although these talks first appeared serially in the *Sunday Digest*, they have a wider audience of church leaders and laymen who want to know what is a reasonable attitude toward the scientific age in which the Church exists. The misunderstandings that have existed between Christians and scientists need not continue to divide persons devoted to extending the Kingdom of God and the kingdom of knowledge open to man under God.

The publisher hopes, therefore, that this book will help persons on both sides of the alleged conflict to remove faulty notions and interpretations from their minds through this source for study.

A Zoologist Discusses Evolution

Dr. Russell L. Mixter is professor of zoology at Wheaton College, Wheaton, Illinois. Dr. Mixter holds the Master of Science degree in zoology from Michigan State University and the doctorate in anatomy from the University of Illinois.

He taught anatomy for one year at the University of Illinois before he moved to Wheaton in 1936. He is a member of the Illinois Academy of Science and the American Scientific Affiliation, of which he was president from 1951 to 1954. He is a specialist in macrophages of connective tissue, spiders of the Black Hills, and the study of evolution.

Dr. Mixter is the author of "Creation and Evolution," a monograph; and he is editor of "Evolution and Christian Thought Today," a symposium.

Mr. Hefley: Dr. Mixter, I understand that you teach a class in evolution at Wheaton. Evolution seems to be an unusual subject to be taught on a conservative Protestant college campus. Do you and other Christians accept Darwin's ideas?

Dr. Mixter: Not at all; and for that matter, some non-Christians do not accept Darwin's theories. However, *evolution* is a fighting word among some Christians. Some would prefer that we ignore it. But I do not think this is a solution. The Darwin theory and other theories of evolution are taught in most of our schools of higher learning, where our young people are exposed to them. Why should we who teach at Christian schools not give them a Christian view?

Mr. Hefley: Where does the conflict between Darwin and the Bible lie?

Dr. Mixter: Scripture declares that God the Creator is intelligent and all-powerful. He made living organisms according to His own plan and purpose. On the other hand, Darwin believed in the creation of only one or a few forms. In later editions of his work he said life was breathed by the Creator into the first forms of life.

Darwin advocated total evolution, which is to say that all living things have evolved from the first living forms according to the laws surrounding them. But this is only theory, and the evidence of science does not confirm it.

Mr. Hefley: Would you mention examples?

Dr. Mixter: Generally speaking, there is not enough evidence to

prove total evolution from protozoa to man and from algae to flowering plants. The record of fossils is too scanty and too broken to prove total evolution.

Mr. Hefley: Will scientists ever find the so-called missing link?

Dr. Mixter: Make *missing link* plural, because a number of links are missing. The most publicized one is the theorized ape-man. Evolutionists believe that if we had fossils of all animals that ever lived there would be no missing links. They think animals on one side of a gap are related to those on the other side because the animals are similar. But evidence from similarity is circumstantial evidence. The similarities might have resulted from kinship, but they may also be the result of creation.

Returning to the missing links that are supposed to connect man with animal ancestry, we know the stratum of the earth which should have the missing links in it is the Pliocene. And it has yielded no fossils to reveal how bipedalism developed. Man is a bipedal being—that is, he walks on his feet only, not on his four limbs as animals do.

I suppose, however, that evolutionists will go on looking for their missing links, and many persons will go on accepting as fact what simply cannot be proved scientifically.

Mr. Hefley: You stated in one of your writings that you believe in *progressive creation*. Would you explain that term?

Dr. Mixter: The fossil evidence shows that some creatures of the

past appear to be the ancestors of present creatures. For example, the best known fossil record is that of the horse. The horse of the Eocene Period appears to be the ancestor of our modern horse. The fossil record, however, does not show us what is the ancestor of the Eocene horse. But between the Eocene horse and our modern horse a great number of changes have taken place. The Eocene horse had toes. Today's horse has hoofs, a longer neck, and a heavier mane and tail.

Mr. Hefley: Then the horse has changed much since creation.

Dr. Mixter: The horse has adapted himself to a changing environment. But, let me emphasize, the horse has remained a horse.

Mr. Hefley: In the first chapter of Genesis the phrase "after his kind" is used. We have "the fruit tree . . . after his kind," "the winged fowl after his kind." This seems to cut squarely across Darwin's theory.

Dr. Mixter: Indeed it does. The "kinds" of Genesis did not evolve. They were specifically created by God.

Mr. Hefley: But do not the geneticists say that there have been biological changes between certain species?

Dr. Mixter: Yes, and I am inclined to agree with them.

Mr. Hefley: But does this not contradict the Genesis account?

Dr. Mixter: Some Christians mistakenly think so. But let me explain my view. About 800,000 kinds of animals and 250,000 kinds of plants live on earth today. *Kinds* mean "species" as the term is used

by geneticists and biologists. The Bible does not claim that God specifically created each one of these thousands of species of living things. Remember that the Genesis account is very general—grass, fruit trees, fowl, cattle. From these general kinds—call them species if you wish—have developed the thousands of species which scientists have classified.

The idea of the fixity of the species cannot be proved from Scripture. The church learned this concept from Linnaeus, who originated it in 1758. Linnaeus assumed that each of the species he could identify was created. But Linnaeus gave up this idea after later studies. Unfortunately, many persons in the church did not. Today we still hear persons say that the Bible teaches fixity of the species. It does not.

Mr. Hefley: Then you say a lot of so-called evolution is merely progressive development within the first families of created kinds.

Dr. Mixter: That is correct. A lot of misunderstanding would be eliminated if this were understood. Some Christians believe that nothing has changed since creation, and they reject all the findings of biological science. On the other hand, many non-Christians believe that the Bible teaches the fixity of species and that the earth is six thousand years old. Therefore, they reject the Bible, calling it unscientific.

When the Bible speaks on scientific matters and is correctly interpreted, it does not conflict with the findings of science. Notice I said *findings*, not *theories*. The Bible

does conflict with certain theories that cannot be proved. I prefer to accept the Bible account, as the inspired Word of God, instead of unproved theories.

Mr. Hefley: Could you illustrate how the Bible agrees with science?

Dr. Mixter: I could cite many examples. Let us look at Jacob's so-called breeding experiment. Nonbelievers have laughed at the Biblical account of Jacob putting green poplar, hazel, and chestnut rods into the water troughs of the goats and sheep of Laban (Genesis 30: 37-39). Because verse 39 says that "the flocks . . . brought forth cattle ringstraked, speckled, and spotted," the critics say the account is mythical. But when we read Genesis 31: 10-12, we see that the angel revealed the truth to Jacob in a dream. According to the angel, the spotted flocks were bred from male parents that had recessive genes for spottedness. This is perfectly in accord with the law of genetics that recessive characteristics not seen in breeding animals may appear in later generations.

Mr. Hefley: Do you see evidence of God in your study of living things?

Dr. Mixter: Everywhere I look I see the evidence of intelligent planning and design. I would be a fool not to believe in an intelligent First Designer and Planner. Consider, for example, the co-ordination of our nerves and muscles. I may prick my finger with a sharp instrument. The nerve impulses go to my spinal cord and I withdraw my finger before I actually feel the pain. The reflex action is based

on all animal life. Then consider how we can purposefully control our muscles. As you make notes of this interview, your brain orders your finger muscles to write the particular words you want. All living things testify to their marvelous Maker. As a scientist I can only bow in reverence.

Mr. Hefley: You have a high appreciation of the genius of God in creating life. I think all persons—Christians and non-Christians—would agree that man is the highest form of life. But not everyone agrees that man is distinctly God's special creation. Can you prove that man is uniquely different from high forms of animal life?

Dr. Mixter: First, man is anatomically and structurally different from the animals. Man is a bipedal creature. He walks on two feet. His upper body is supported on his pelvic bones. In contrast, the apes customarily walk on four limbs, and their pelvic bone structure is different from man's.

Second, man is culturally different from the animals. For example, consider language. Genesis says that Adam named the animals. Man can communicate by means of highly developed language. Animals cannot communicate in such a fashion.

Third, the most distinctive difference of all is that man is a spiritual creation of God. Only man has the capacity to worship God. Only man is created in the image of God. Only man can know God.

Mr. Hefley: What do you believe is man's highest conception of God?

Dr. Mixer: Man receives his highest knowledge of God through the Biblical revelation of Jesus Christ whom I believe was God's Son. When I was twelve years old, I committed my life to Christ. Since then I have grown spiritually, physically, and mentally, but I have never found reason to give up my boyhood faith in Christ as my Savior.

Mr. Hefley: Do you think Christians—particularly Christian young people—should study science? Do we have a ministry there?

Dr. Mixer: God instructed man in Genesis to have dominion over, to multiply, replenish, and subdue the lower creation. The Bible teaches that the lower creation is to be used for man's benefit and

God's glory. The quest of scientific knowledge falls within these instructions.

Young people who are scientifically inclined should study science. Science can bless or curse mankind. Consider two examples. Knowledge of the atom can be used to destroy or to benefit the world. Knowledge of bacteria can be used in bacteriological warfare or to combat human disease.

There is a broad ministry in the field of science. Besides the good that he can do through science, the scientist who is a Christian can communicate the Gospel to the non-Christian scientist. And the non-Christian scientist needs the knowledge of Christ as much as anyone does.

Sound spiritual...

Can Physical Ailments Have Spiritual Causes?

Dr. Howard Hamlin, distinguished Chicago surgeon and churchman, received his medical degree from the University of Colorado and is a member of the Illinois Surgical Society, the American Board of Surgeons, and the American Society of Abdominal Surgeons. He has been honored by election as a Fellow of the American College of Surgeons and Diplomate of the American Board of Surgery.

During World War II, he served in the U.S. Army Medical Corps. After the war he was appointed Chief of Orthopedics at the largest general hospital in the Far East Command. Then as Assistant Chief of the U.S. Army Surgical Service, he served as a consultant on the staff of General Douglas MacArthur until 1948.

Mr. Hefley: Dr. Hamlin, speaking as both a Christian and a doctor, would you say that many physical ailments have spiritual causes?

Dr. Hamlin: Yes. Insecurity, fear, anger, anxiety, and a host of other basic emotional problems contribute to disease and the breakdown of the functions of our bodily organs. Tension, anxiety, and worry are believed by many doctors to be factors in the development of stomach ulcers. Peter Marshall, the great Senate chaplain, was reported to have prayed in the Senate, "Lord, forgive us the sin of worrying, lest stomach ulcers become the badges of our guilty consciences."

Some women have gall bladder attacks every time they quarrel with their husbands. This does not mean that all quarreling women will have gall bladder disease, or that all gall bladder attacks are precipitated by quarreling. But we do know that some attacks are caused by mental stress.

Mr. Hefley: Then is spiritual good health a boon to physical well-being?

Dr. Hamlin: Yes. The person who is living at peace with God and his neighbor is less likely to become a doctor's patient.

Mr. Hefley: Do you see a relationship between God's power to heal and the skill of a surgeon?

Dr. Hamlin: I believe that my work as a surgeon complements and helps God's processes of healing. I often tell patients before surgery that I am a man who is pruning the bad limbs off the trees in his orchard. In the operation I will

be simply God's tool in pruning out the bad tissue. God's power will do the healing.

Mr. Hefley: When you talk with your patients before surgery, do you ever pray with them?

Dr. Hamlin: Yes, many times. I know that prayer will calm the fears of a patient and prepare him to face an operation with his faith in God. I have had some rich experiences in praying with and for patients.

Mr. Hefley: Tell me about one or two.

Dr. Hamlin: I remember one in particular. The patient was an Italian woman. I hesitated to ask for permission to pray with her because she was a Roman Catholic. But I asked and she consented. Several hours after the operation I went to check on her. Her son met me at the door, with tears streaming down his face. "Doctor," he said, "the first thing Mother told us when she regained consciousness was that you had prayed with her."

Another of my patients was dying of cancer. Late one night I became concerned about her spiritual condition. I went to the hospital and found her half conscious. "Are you a Christian? Have your sins been forgiven?" I asked her. She nodded; I prayed.

Early the next morning as I made my rounds, I met the night nurse in the corridor. "How is Mrs. _____?" I asked. "You know—the one who is dying of cancer."

"She has been delirious since I came on duty. She keeps telling me that you came here last night and prayed for her."

"Well, I did," I told the surprised nurse.

Mr. Hefley: She must have thought it unusual for a doctor to pray with his patients.

Dr. Hamlin: Many others have expressed surprise. But I see no inconsistency between prayer and my profession. Of course, I try to call a patient's pastor before an operation. Patients like their pastors to be near and to pray with them.

Mr. Hefley: Let us pursue the subject of prayer further. Do you believe in divine healing?

Dr. Hamlin: Yes, but I believe one should go about it in a way that honors God.

Mr. Hefley: Please explain.

Dr. Hamlin: First, we Christians are not exempt from natural law simply because we are Christians. Sooner or later, in the flesh, we shall die in an accident or of a disease.

When we do get sick, we have available the skills of doctors and the wonders of modern medicine. I believe God expects us to take advantage of these resources that will help start the God-given laws of healing to work in our bodies. This is divine healing, for a doctor can do no more than help the healing processes which God has created.

Let me emphasize, then, that Christians who become ill should do all that is humanly possible to speed recovery.

Regarding the cases that are beyond medical art, some persons say that one's healing depends upon the amount of his faith and that it is God's will for all Christians to

be free of disease. But this is not so.

One cannot draw a line between the healthy and the unhealthy as he can between the Christian and the non-Christian. All of us are only relatively healthy or unhealthy. I recall a pastor answering a questioner by saying, "I have seen God heal on many occasions, but I have also stood beside a thousand graves."

Sometimes it is God's will to heal. I have seen evidence of this beyond the explanations of medical science. For example, during one of our camp meetings a woman testified that she had been healed of diabetes and had not used her insulin for more than a week. I asked if I might check her blood sugar, knowing that it had been 390 milligrams for one hundred centimeters of blood at the last analysis. That much sugar content is found in serious diabetes. I was thrilled to find that she had a low normal of ninety. It was apparent that her cure was from God.

Mr. Hefley: Let us say that I have an incurable cancer. You have examined me and informed me that medicine can do nothing except ease my pain. How should I go about praying for healing?

Dr. Hamlin: You should earnestly seek God and pray that you might be healed if it is His will according to James 5: 14, 15. But do not put Him under obligation. Then you should ask your pastor and Christian friends to pray for you.

Mr. Hefley: You believe, then, that it is good for other Christians to pray for one who is sick.

Dr. Hamlin: Very much so.

Mr. Hefley: What is your opinion about the so-called faith healers?

Dr. Hamlin: If you refer to godly ministers and evangelists who are sincere and honest in their calling, then I recommend their services. But, quite frankly, I doubt the honesty of many so-called faith healers. One should ask several questions before he gets into a healer's line:

1. Are the methods of the healer Scriptural? Does he make a spectacle or an advertising stunt out of healing? Is he an exhibitionist who is bringing shame upon God by conducting a religious circus?

2. Does he give priority to the preaching of the Gospel?

3. Has he cured anyone? Beware of frauds and psychological "healings."

4. Can his financial methods and affairs bear public scrutiny?

Mr. Hefley: Let us move to another subject. Have you seen evidence of the handiwork of God in the function of the human anatomy?

Dr. Hamlin: Yes. It is difficult for me to understand how any doctor can be an atheist. The human body possesses a lavish margin of safety. One can live with only one-fourth of one kidney functioning. Our lungs contain five lobes. Life can be sustained with only one lobe. One can live on only one-ninth of his liver tissue, although the liver is the one organ which regenerates remarkably after onslaught of disease.

Our bodies contain armies of fighting cells called leucocytes.

When germs enter the body through a wound, the leucocytes, or white corpuscles, attack the invaders immediately. They are reinforced by other leucocytes that squeeze right through the walls of the small blood vessels. Some of these fighters form a living wall with their bodies to hold back the germs. As the battle becomes fiercer, the small blood vessels enlarge so that more leucocytes can get through in a hurry. Then the dead cells and the germs they have killed pile up and form pus.

Mr. Hefley: You said a moment ago that it is difficult for you to understand how a doctor can be an atheist. Why, then, are there not more Christian doctors?

Dr. Hamlin: The medical training of doctors is geared to a humanistic approach. Everything is supposed to have a natural cause, one that can be explained through research and knowledge. In general the teaching of most medical schools revolves around naturalism, not supernaturalism.

Also, a doctor is tempted to rely only upon his own resources. He tries to find a remedy or cure for every sick person who visits him. Because he is often successful, he is tempted to become independent from God.

It is a rare thing for a doctor to become a Christian after he has begun to practice. Most of the Christian doctors I know were reared, as I was, in Christian homes.

Mr. Hefley: Are you saying that if we are to have more Christian doctors we must rear them instead of convert them?

Dr. Hamlin: Yes, although it is possible for a doctor to be converted. It has happened. But the primary factor is the Christian home where children are taught to revere God and to depend upon Him.

Mr. Hefley: And what comes

in the children's lives after that?

Dr. Hamlin: I heartily recommend attending a Christian college, although I attended a state university. The minds of young persons are easily molded. They need the example, influence, and wisdom of Christian teachers.

Is Time Headed Toward Chaos?

Dr. Edson Peck has been a distinguished professor of physics for twenty years at Northwestern University in Chicago. He holds the B.A. and the M.S. degrees from Northwestern and the Ph.D. in physics from the University of Chicago.

He has been a consultant to Argonne National Laboratory, the government's atomic research installation near Chicago. He is a member of the American Physical Society, the American Mathematical Society, and the Optical Society of America. He is a fellow of the American Association for the Advancement of Science and a member of Phi Beta Kappa, national honorary scholastic society.

Dr. Peck has been awarded research grants of more than forty-five thousand dollars by the National Science Foundation and the U.S. Defense Department.

Mr. Hefley: You are both a physicist and a Christian. Do your roles conflict?

Dr. Peck: Not at all. When the facts of science are carefully assessed and the Bible is carefully read, they do not conflict. I believe the miracles of Christ's Incarnation and Resurrection.

Mr. Hefley: Do many of your science students ask you to prove your belief in an intelligent Creator?

Dr. Peck: Indeed they do.

Mr. Hefley: Would you tell some of the evidences you present in proving your belief?

Dr. Peck: I can give many. First, let us look at the "red shift" among the stars.

At one time scientists believed we would never know the material of which the stars are made. But by using the spectroscope we now know the stars and our earth are made of the same atomic elements.

The spectroscope makes a spectrogram, which is a picture of the wave lengths of color that are present in the light of the stars. Each atomic element has a recognizable pattern of wave lengths. For example, sodium has a strong yellow, and mercury has a strong green. These two elements are often used in street lights.

The spectral lines from the stars are familiar patterns to us. If a pattern shifts away from its normal position to one of lower frequencies, we know this results from the velocity of the stars going away from the earth.

Mr. Hefley: Do you mean that the stars are moving away from the earth?

Dr. Peck: Precisely. And that is the point I wish to make. Our universe is expanding; it has been blowing apart for a long time. The "red shift" of the spectral patterns of the stars is toward a lower pitch in terms of light. In terms of sound it is like a locomotive blowing its whistle: the pitch is higher as it approaches and lower as it moves away.

If our universe has been constantly expanding, there must have been a time when it started to expand.

Mr. Hefley: But where does God come into this picture?

Dr. Peck: As a physicist, I observe the expansion of our universe. I observe that it had to have a beginning, and that it was begun by an intelligent Designer.

Mr. Hefley: I have always wondered how you physicists calculate the age of our universe.

Dr. Peck: No scientist can dogmatically state the exact age of our universe, but radioactive decay is one method we use to estimate the age. Let me explain.

We know there are certain heavy atoms whose nuclei emit radiation. They are constantly giving off part of themselves, changing their natures, and turning from one element into another. This is a natural process. It is not influenced by environment. It occurs whether the atoms are hot or cold and regardless of whether they are under pressure.

According to certain statistical laws, we know that after a given number of years, half of a collection of atoms will have decayed. This "half-life" becomes the time

when an element gives off its atoms to become a different element.

These particular atoms act as a kind of clock for the universe. Uranium 238, for example, has a half-life of four and one-half billion years. It divides in every four and one-half billion years and gives off a helium nucleus. That we still have U-238 atoms indicates that the universe has not existed forever.

In contrast, Plutonium 239 has a half-life of only twenty-four thousand years. But this element is not found in nature. We have to make it, because all original Plutonium has been destroyed.

Thus the absence of natural Plutonium indicates that our universe began more than twenty-four thousand years ago, and the presence of Uranium shows it was not much more than four and one-half billion years ago.

Mr. Hefley: How do you reconcile this estimate with the days of creation in the Book of Genesis?

Dr. Peck: Let us take a close look at the first chapter of Genesis. The Hebrew word for *day* is *yom*. *Yom* is used elsewhere in the Bible to refer to periods of time other than a twenty-four-hour day. Furthermore, not until the fourth day were the time keepers, the sun and the moon, said to have been created. Frankly, I do not think there is a problem if one carefully reads and believes his Bible.

Mr. Hefley: Could you give another evidence for the existence of God?

Dr. Peck: We have good reason to believe that the universe is like a big clock engine that is slowly

running down. Someone must have started it in motion. I believe that the starter was God.

Support for this idea comes from an unchangeable principle known as the second law of thermodynamics. Briefly stated, this law says that heat is the source of energy, and that it is not possible to move heat from a cold to a hot reservoir without making an unnatural change. An unnatural change would be the use of a heat pump to take heat from winter air.

Now, before I go further, let me define a principle we call entropy. Entropy is the reduction of temperature differences in a system that leads towards uniformity of temperatures. According to the second law of thermodynamics, entropy can increase only when a system changes. Low entropy occurs where there are high and low concentrations of temperature; high entropy occurs as the temperature becomes more uniform. The rule is that order accompanies low entropy, disorder accompanies high entropy.

Our universe is moving toward higher entropy and consequently disorder. ~~This accords with the law stated above.~~ Temperatures are becoming more uniform, less varied.

Because this is a natural, physical process that is proceeding from order to disorder, we can see that time is headed in the direction of chaos. The movement toward uniformity of temperatures is braking the cosmic engine powering the universe to an inevitable stop.

This supposes a beginning (order with temperature variation) and an end (disorder with tem-

perature uniformity).

In the beginning, the energy of our universe was apparently concentrated in a single power. This power, or primeval matrix, possessed a high degree of heat, or low entropy. The other alternative is that all heat was distributed evenly in the beginning. But we know this could not have been true, or we would have had a most disorderly universe.

In short, I believe that God produced our orderly universe (low entropy) by separating the heat from the cold. He may have concentrated all heat into the primeval matrix, which exploded, scattering the heat. This may explain Genesis 1:4, which says that in the beginning God separated the light from the darkness.

Mr. Hefley: Do you think, then, that God planned our universe for only a definite period of time?

Dr. Peck: I do. The one-way flow of time and the slowing down of our cosmic engine indicates there is a specified time between creation and dissolution.

Mr. Hefley: What will happen when the universe runs down?

Dr. Peck: I believe God will "rewind" the clock. That could be the new Heaven and the new earth spoken of in Revelation.

The evidence shows that long ago an intelligent God created our universe and put it in order. Now it is heading toward disorder. That

cannot go on forever. I believe that when the ultimate end comes, God will restore perfect order.

Mr. Hefley: Dr. Peck, at the beginning of our talk you said that for you there is no conflict between the Bible and science. But we know that between other Christians and other scientists there frequently is conflict. Where does the fault lie?

Dr. Peck: The fault lies on both groups. Some Christians jump to conclusions that cannot be justified by a careful study of the Scriptures. Some scientists proclaim mere theories and opinions as dogmas. Quite often their assumptions and dogmas meet and clash in opposition.

I think that Christians should have a healthy respect for science as an honest search for truth. For example, the Piltdown Man hoax was discovered by a scientist; yet many well-meaning persons gave Christianity the credit, announcing that science had been discredited.

I believe that the scientist who is a Christian has the task to speak to both the Church and the world, so that the Church may understand the role of the scientist.

My church once invited me to conduct a three-month study on science and the Bible. I was happy to do it. Many Christians have a vague feeling that science and the Bible conflict. I was glad to assure my fellow church members that that is not true.

Scientific Research for the Healing of Mankind

Dr. Conrad A. Blomquist is assistant dean of the College of Pharmacy in the University of Illinois at the Chicago medical center.

Dr. Blomquist holds B.S., M.S., and Ph.D. degrees from the University of Illinois. His major fields of study were zoology, physiology, and bacteriology. He has done special research on fluorescence of kidneys, vitamin E deficiency, Golgi material, and nitrochondria. Besides his administrative duties, he teaches a graduate course in histological techniques (study of tissues) and undergraduate courses in general zoology, anatomy, and histology. Dr. Blomquist is an active member of the American Scientific Affiliation.

Mr. Hefley: For what are your students preparing?

Dr. Blomquist: Most of them are preparing for careers in pharmacy. They will dispense drugs in hospitals and drug stores on the orders of physicians. Others will be teachers, medical representatives for drug companies, or research scientists in drug development.

Mr. Hefley: Do you see much spiritual interest among your students?

Dr. Blomquist: I am sorry to say that there appears to be less spiritual interest now than when I was a student.

Mr. Hefley: How do you account for this decrease?

Dr. Blomquist: There are several reasons. The speed at which we live in the sixties does seem to give many students no time for God and spiritual matters. Many of today's students show a lack of discipline because of reduced home influence and overindulgent parents who give them whatever they want. Also, science students seem to fall into the same pattern as the majority in assuming the materialistic attitude that is characteristic of our society.

Mr. Hefley: Are science students no longer motivated by a concern to benefit humanity?

Dr. Blomquist: Many, though not all of them, are motivated toward the materialistic goals of society—social status, good salary, and comfortable living environment. Let me point out, however, that most students are affiliated with some church. The church, however, does not always influence their lives.

Mr. Hefley: Do you think the

Church has failed to instill spiritual values into its young people who study science?

Dr. Blomquist: Yes; in many instances the Church has failed to convince students of the importance of spiritual ideals, because many churches are concerned mainly with materialistic goals themselves.

Mr. Hefley: What do you think about science students who are interested in doing research?

Dr. Blomquist: Money is not their first concern. They desire to be creative and to accomplish something worthwhile for the benefit of humanity, even if it means turning down top salaries in other fields.

Mr. Hefley: You speak of scientific research for the benefit of mankind. Do you see a kinship between the work of the Church and the pharmaceutical sciences?

Dr. Blomquist: Oh, definitely. Jesus commissioned us not only to preach the Gospel but also to "heal the sick." Discovering new drugs and dispensing them to alleviate human misery is allied with the work of the Church in this respect.

Mr. Hefley: Do you think, then, that spiritual leaders should encourage young persons to enter the scientific fields—in your case, pharmacy?

Dr. Blomquist: By all means. Christians should be at the forefront, seeking new ways to help suffering mankind. They should take active parts in social and political fields in which Christianity could do a great deal. We who have been redeemed by Christ should strive to show evidence of these re-

demptive influences to our fellow men.

Mr. Hefley: Can a pharmacist find evidence of God in his work?

Dr. Blomquist: It seems impossible for one not to observe the handiwork of our Creator in the makeup and function of the human body. A pharmacist must have a basic knowledge of zoology, physiology, and anatomy to know how drugs affect the functions of the body. He cannot help but see God's laws at work as he studies the reactions of bodily organs to specific medicine.

Mr. Hefley: Pharmacy is quite an old profession, is it not?

Dr. Blomquist: This profession originated four thousand years ago. The earliest records describing the art of the apothecary have been found in the ancient countries of Babylonia, Assyria, and Egypt.

In the Bible are references to "dead flies" in the ointment of the apothecary, the fig poultice applied by Isaiah, and many references in Jeremiah and elsewhere to the medicinal virtues of leaves and plants.

The pharmacist is strikingly illustrated in the Song of Solomon 3: 6, where he is described: "Who is this that cometh out of the wilderness like pillars of smoke, perfumed with myrrh and frankincense, with all powders of the merchant?"

Mr. Hefley: Was not pharmacy in ancient days sometimes related to witchcraft?

Dr. Blomquist: Yes. Pharmacy comes from the Greek word *pharmakou*, which means "use of medi-

cine" or "the practice of witchcraft." Primitive pharmacy was closely involved with the mysterious. Often the pagan priest or religious leader was the pharmacist who dispensed charms and potions.

We are all familiar with the methods of the American Indian medicine man. Primitive pharmacists believed in the casting of the horoscope; the influence of metals, plants, and constellations; foreboding bad signs; and a host of things that had nothing to do with medicine.

Mr. Hefley: Have not some of those old remedies proved to be sound?

Dr. Blomquist: In some instances, yes. For example, opium was used as an antipain drug to relieve stomach ailments. Today we use its derivatives (paregoric, for example) in cases of intestinal disturbances. The juices of the belladonna plant were used by primitive women to enlarge the pupils of their eyes for the sake of beauty. Today, oculists use a drug from the plant to dilate the pupils of the eyes.

A third example is digitalis, which was extracted from the common foxglove, a biennial herb which has large leaves and purple flowers. In many parts of Europe it grows wild. Digitalis was used in the treatment of dropsy at first. Its value was supposed to lie in its ability to release excess water from the body. In recent times research has shown that the benefit is due to its effect on the heart.

Today we have a whole group of digitalis drugs. Some increase the excitability of the heart, causing

it to beat more slowly and forcefully, overcoming weak and irregular beating and bringing relief when the heart is under stress.

Mr. Hefley: There have been some exciting discoveries in drugs during the past few years.

Dr. Blomquist: Yes, there have been some marvelous developments in discovery and application of new drugs. But this is a slow and expensive process.

Think of sulfa drugs, for instance. Thousands of sulfa drugs were developed in the pharmaceutical laboratories, but only a few proved effective and safe to use. Then came penicillin, which was supposed to be the main remedy for almost anything. Now research has shown many of the antibiotics to be more satisfactory than sulfa or penicillin in combating some diseases.

Mr. Hefley: Finding new and better remedies for disease is a long and arduous task, is it not?

Dr. Blomquist: Yes, but the effort is worth it. As an example, only a few years ago pneumonia meant death or a long stay in the hospital. Today, one may develop a severe case of pneumonia, but if he is given the proper medication, in a few days he can go back to work.

Within the wisdom of God's creation, we know there are certain cures for certain diseases. God has commanded us to use the lower creation to improve our lot.

Mr. Hefley: Do you see a spiritual significance in man's constant effort to prolong life?

Dr. Blomquist: It seems that this effort is a kind of evidence for immortality. Man's God-given instincts make him want to live forever, despite the troubles of this life.

Mr. Hefley: Many persons seem to hope that the discovery of new drugs will prolong life indefinitely. Do you see prospects of this becoming a reality in our lifetimes?

Dr. Blomquist: No. The human body is mortal, and as such it must eventually wear out regardless of how many wonder drugs are available; although I am sure life expectancy will continue to increase with the discovery of new drugs and medication. I am a Christian, and I shall live forever with God.

Mr. Hefley: It is encouraging to hear a man in your position give a positive testimony for Christ. Do you have anything else you wish to say?

Dr. Blomquist: Let me add that the drugs produced in recent years have created problems and opportunities for Christianity. The population explosion has been triggered to some degree by the development of new drugs. Fewer children die in infancy. Prenatal medicine and care make it possible for women to have children who might not otherwise have been able to be mothers. All of this means there are more persons born every day who will need to hear the Gospel.

People are living longer, giving us a greater number of elder citizens. The church must gear its program to provide for them.

Evidences of God in Plant Life

Dr. Frank A. Crane is professor of pharmacognosy and botany at the Chicago campus of the University of Illinois.

Dr. Crane, a native of Pittsburgh, holds four academic degrees, including the Ph.D. from the University of Rochester, New York. His major field of study was plant physiology. His graduate dissertation was "The Study of the Metabolism of Peppermint Plants as Affected by Nutrition."

At the University, Dr. Crane teaches graduate and undergraduate lab courses in pharmacognosy (the study of drugs from plant and animal origins), plant anatomy, plant physiology, botany, and plant nutrition. He wrote the "Layman's Point of View" in "Arnold's Commentary" for 1962.

Mr. Hefley: Dr. Crane, your dissertation was about the peppermint plant. I confess my curiosity. Is that the source of peppermint flavoring and chewing gum?

Dr. Crane: Yes. I have a plant outside my living room window. The plant produces a volatile oil which is used in food flavoring, some medical remedies, chewing gum, and even some cosmetics. Thousands of pounds of oil from the peppermint plant are used in this country every year.

The peppermint plant is an amazing creation. It contains a built-in insurance system for pollination. If an insect visits a plant, it must be pollinated.

Mr. Hefley: As a scientist and a Christian, do you see in this any evidence of God's design?

Dr. Crane: I do not see how it could be otherwise. Neither a plant nor a medieval castle could have been built by chance. In the plant world are many testimonies to divine planning and creation—for example, the lowly dandelion and the way it produces seeds.

Mr. Hefley: I am quite interested. I cannot rid my lawn of dandelions.

Dr. Crane: That is because their seeds can be blown onto a lawn with dense grass and still take root and grow. The seeds have hooks on their sides. As the seeds swell and shrink during variations in the weather, those hooks help them to bury themselves. Then they germinate and produce the clusters of flowers we see dotting our lawns in the spring.

Mr. Hefley: Doctor, you reveal great admiration for plant life.

Dr. Crane: Plants are a fascinating study for me. But let me hasten to say I am not a nature worshiper. I worship the living God of the Bible.

Mr. Hefley: Since you said that, I would like to have your opinion of folk who claim they do not need to attend church or read the Bible because, as they say, they can worship God in nature.

Dr. Crane: I sincerely doubt if they are worshiping God. So-called worship in nature is often merely worship of things—worship of the Creation instead of the Creator.

Mr. Hefley: What spiritual value, then, is there in contemplating the natural creation?

Dr. Crane: It can lead to a reverence and appreciation for the handiwork and design of the Creator. But one does not come to God through appreciation of His works.

Mr. Hefley: How, then, do you think one comes to God?

Dr. Crane: Recognition of one's need is the basic requisite. When I was a young boy I realized that I needed forgiveness and a cleansed heart. In a small church that need was met when I surrendered to Christ as my Lord. Since then God has responded to my personal need whenever I have sought His help.

Mr. Hefley: Would you share some of your experiences?

Dr. Crane: We had a five-year-old daughter who contracted encephalitis and died within twenty-four hours. I was stricken with grief. But when I sought God in prayer, He helped me.

I had been teaching in high school for ten years when I felt the desire to return to college for grad-

uate training. I prayed about the matter and asked God's guidance. He led me back to school and gave me the wisdom to obtain my Ph.D.

God met my needs and became very real to me in a personal way at many other times in my life. But I want to point out that I came to God as any other person must. The scientist has no special advantage with God. Science simply cannot meet the deepest needs of life. One cannot find God through a scientific method.

Mr. Hefley: Some persons say science and faith conflict. Do they?

Dr. Crane: At one time I thought they did. While I was working on my doctorate, I was perplexed by the claims of evolutionists that science disproves the Creation story in Genesis.

Mr. Hefley: You overcame your doubts, I assume.

Dr. Crane: Yes, after making an intensive study of the claims of evolutionists, I came to believe that development does occur in genus and species—the lower divisions of plant life. But in the upper divisions—families, classes, orders, and phyla—is little evidence that there have been substantial changes. These upper divisions may well be the “kinds” that the Genesis record says God created. Some evolutionists say that the main phyla have developed from a single general cell to the advanced stages of life we have today. But this is only their theory, not scientific fact.

Mr. Hefley: In your opinion, why and how does conflict occur between Christians and scientists?

Dr. Crane: Quite often a scien-

tist speaks before all the evidence is in. He has considered one or some possibilities, but not all. Some Christians follow the same illogical pattern of speaking dogmatically before all the evidence is in. Much evidence is yet to be uncovered by both Christians and scientists.

Mr. Hefley: As a Christian, are you afraid that future findings by scientists may weaken your faith?

Dr. Crane: No. The God I know is all-wise and all-knowing. He does not make mistakes. I am looking forward to the time when we can understand the present unsolved mysteries of our universe. I think in the end there will be perfect accord between faith and science.

Mr. Hefley: I would like to continue our discussion on so-called conflicts between science and faith regarding the miracles of the Bible.

Dr. Crane: Some persons try to find natural explanations for those unusual events. Some say, for example, that the burning bush Moses found was a shrub and red flowers and that the sunlight striking it at a certain angle made it look as if it were burning.

Also I have heard the wilderness manna described as a mixture of complex carbohydrates with a high percentage of mamose sugar. This substance grows on a lichen plant in the area where the Hebrews journeyed.

Mr. Hefley: Do you accept this kind of explanation?

Dr. Crane: Not in most cases. I think it unwise to seek a scientific explanation for every unusual event in the Bible.

Mr. Hefley: Do your college students realize the truth that God is wiser than we are?

Dr. Crane: Most of my students do profess a religious faith of some form. But often it is only a form; it does not penetrate into their daily living. Their dependence upon God's help does not show, except in the lives of a small minority.

Mr. Hefley: As a professor, do you see a breakdown in moral and spiritual standards?

Dr. Crane: Yes. One of the most obvious is the cheating at test time. You would be amazed at some of the elaborate schemes college students use to fool teachers. I know of one fellow who had pages of notes twisted around pencils. Others have written information on the inside flaps of their lab coats. Some have used coded systems of dots and dashes carved on their pencils. One fellow had what was called an educated toe. He would place his books on the floor while taking a test, then use his toe to flip the pages to the answers.

Mr. Hefley: Why do you think students cheat?

Dr. Crane: First, cheating is a reflection of the breakdown of honesty and integrity of society as a whole. Students read of corruption in government, business, and labor. They adopt the philosophy that says you get what you want by the best method you can.

The competition for good grades is very keen in our universities today. Especially since the Russians

launched their first satellite I have noticed an intense desire among students to succeed, even if it means cheating.

Mr. Hefley: How do you cope with cheating?

Dr. Crane: For one thing, I tell students they are cheating only themselves in the long run. Then I space my students during tests to make it more difficult for them to cheat. When I do catch students cheating I report them to the proper authorities.

But let me emphasize that these are only stopgap measures. Children must be taught before they reach college age that it is wrong to cheat. There simply is no substitute for the old-fashioned, God-fearing Christian home.

Mr. Hefley: Your convictions reveal that you had good rearing.

Dr. Crane: Yes, although in the main it was my foster parents who took me to church and saw to it that I received the proper moral and spiritual teaching.

Mr. Hefley: Is Christian training more important than training in the sciences?

Dr. Crane: Yes, if one has to make a choice between the two. But there is certainly nothing wrong with Christian young people entering the science professions. Actually the need is great for Christian teachers and scientists.

Mr. Hefley: I am sure that in your capacity you will be able to lead some Christian young people to help fulfill that need.

There is an increasing and commendable interest among professing Christians in the study of emotional and mental problems. Many, however, are still reluctant to seek psychiatric help when it is needed. Because of this, the publisher wishes to call special attention to the interview with Dr. David Busby, beginning on page 35.

Dr. Busby discusses major forces which are factors in causing mental illness and points out that God's instruments of help for the mentally ill may certainly include a psychiatrist. Read the interview carefully.

Christians with Mental Illness

Dr. David Busby, a certified member of the American Board of Psychiatry and Neurosurgery, is in private practice in Niles, Illinois, and is a psychiatric staff consultant at Lutheran General Hospital in Park Ridge, Illinois.

Dr. Busby received his B.S. degree from Duke University and his M.D. degree from the University of Tennessee Medical School. After six years of practice as a medical doctor he returned for specialized psychiatric training at Hines Veterans Administration Hospital in Chicago. His program at Hines included child psychiatry with the Institute of Juvenile Research and female psychiatry at the University of Illinois Chicago campus. He received certification as a psychiatrist in 1958.

Mr. Hefley: After practicing general medicine for six years, why did you decide to enter psychiatric training?

Dr. Busby: First may I say that I was in group practice with several Christian doctors. We felt that by working together we could better meet the physical and spiritual needs of our patients. In my consultations with patients, I noticed the alarming number of them who had emotional and mental problems. Bear in mind that most of my patients were professing Christians and many were active church members. Naturally I wanted to help them regain mental health, but that had not been my field of study in medical school. Then I decided to become a psychiatrist.

Mr. Hefley: A psychiatrist, I believe, always has a medical degree in addition to his psychiatric training, whereas a psychologist has only on academic training.

Dr. Busby: That is correct. In order to practice, a psychiatrist must be certified by the American Board of Psychiatrists and Neurosurgeons.

Mr. Hefley: You have said that Christians are not free from mental health problems.

Dr. Busby: Yes, no more than Christians can live without physical ailments. To be perfectly frank, no one—Christian or not—is in perfect mental health. We are all a bit unbalanced at times. All of us are only relatively sane.

Mr. Hefley: As a minister, I have recommended psychiatric help a number of times; but I have found that people are reluctant to seek the help of someone in your field.

I get the impression that they feel guilty.

Dr. Busby: Your impression is quite true of many Christians. That makes my task much harder. I often have to spend several hours with a patient, helping him to see that it is proper to seek psychiatric help.

Mr. Hefley: What do you think is behind this widespread feeling of guilt about consulting a psychiatrist?

Dr. Busby: Erroneous Christian teaching by ministers, Sunday school teachers, and even some so-called theologians is a major factor. This teaching assumes that if one becomes mentally ill, he must be guilty of some specific sin. Personal sin is often related to mental suffering, but not always. Many other factors are involved.

The person who has a mental breakdown, for example, may work himself into an awful guilt complex. Also, in that kind of environment, he will feel the impact of the thinking of others who are wondering what the mentally ill person has done.

Mr. Hefley: I knew a minister's wife who had what we called a nervous breakdown. I confess that at the time I wondered where she had erred.

Dr. Busby: That is a common misconception which Job's critics had. They believed that his troubles came because of personal sin, whereas in reality his suffering came from Satan under the permissive will of God.

Mr. Hefley: As a doctor, do you look for causes and cures for mental illness?

Dr. Busby: Yes, but that is no easy matter even for a psychiatrist. Mental illness, you see, is usually more complex than physical illness. There is no simple cause-effect operation to be found. Many factors are involved in triggering a mental illness. Thus it is naive to assume that some personal disobedience of God's spiritual law is the cause of the illness. There are many causes.

Mr. Hefley: Could you make this clearer, perhaps by using an analogy?

Dr. Busby: Think of the proverbial straw that broke the camel's back. The question is, which straw broke the camel's back—the last one, the middle one, or the first one? It cannot be pinpointed easily. To get rid of the last straw and restore the camel's broken back would not solve the problem. It would not be long until another straw would be loaded onto the camel, and his poor back would break again.

Or, use this analogy. A gun fires a bullet into a wall. A chain of causes is involved in the firing: the brain that made the decision to fire; the nerve impulse that sent the command to the muscle; the muscle that pulled the trigger; even the gunpowder that powered the bullet. And if a person happens to be standing on the other side of the wall, then the shooting may have multiple effects. The person who is wounded will be affected. So will his family, his doctor, his employment, and perhaps even his insurance company.

Summing up what I am attempting to say in these analogies, many

casual factors are involved in a specific mental illness, and those factors often set off a chain reaction, which triggers a breakdown.

Mr. Hefley: I would like for you to pursue the causes of mental illness a bit further.

Dr. Busby: Broadly speaking, I believe three force factors may operate in causing mental illness.

First are physical forces. Heredity, blows to the head, infections or poisoning of the brain and nervous system, tumors on the brain, alcohol, and narcotics are some of the physical causes that may be involved.

Second, psychological forces include excessive anxiety, guilt, fears. Many of these occur in childhood. A child may grow up hating his cruel father. Because of home influences the personality may be crippled, stunted, and distorted.

Third are spiritual forces. Spiritual forces from God work for a person's emotional good. Among these we find the power of prayer, Bible reading, the work of the Holy Spirit, and the bestowal of the gifts of the Spirit—love, joy, peace. We also find evil spiritual forces. I happen to believe in a personal Devil. Satan often attacks a Christian to bring mental illness.

These forces—physical, psychological, and spiritual—may operate at any time during a person's life. Psychiatry generally classifies them into three areas of life: (1) prenatal (before birth), (2) childhood, (3) adulthood.

Mr. Hefley: I see what you mean when you say it is not easy to pinpoint the cause of a specific men-

tal illness. This knowledge should help Christians be more sympathetic with the mentally ill person.

Another question concerns many Christians. Perhaps your answer will clear up a lot of misunderstanding. The question is, How does God heal mental illness?

Dr. Busby: Perhaps first I should say this. First, it is not always God's will that every mental illness be healed in this life, no more than it is His will that every physical illness be cured. From this standpoint, not even a Christian can put God under obligation to heal mental disease. Second, some anxiety is actually neither good nor bad: it is natural. The morality of it depends upon how one reacts to it.

Many times Jesus was agitated. In the *Amplified New Testament*, we read in John 11: 33, 38 how Jesus felt at the tomb of Lazarus. He was "troubled," "disturbed," and "deeply disquieted." The point I make is that Jesus was not always calm.

Mr. Hefley: I think of passages such as Isaiah 26: 3 and Philippians 4: 6, 7. They speak of God's peace being in the heart of the one who commits everything to Him.

Dr. Busby: Yes, but the peace of God is not to be thought of as a state of mind that lets Christians float through life without ever getting disturbed. To put it another way, God's peace does not make a person so Heavenly minded he is no earthly good. We need peace and serenity in these troubled days, but we also need to become disturbed and anxious about meet-

ing the spiritual needs around us.

Mr. Hefley: I agree with that.

Dr. Busby: Now let me answer your question: "How does God heal mental illness?"

Remember I spoke of three major forces which are factors in causing mental illness: physical, psychological, and spiritual. Healing comes when God removes, counteracts, and compensates for any or all of the various forces that contribute to the trouble. To simplify the matter, let us say that a person holds a passionate hatred for the persons around him—his family, his neighbors, his fellow employees. One of the forces behind this is his father, who repeatedly beat him severely in childhood. If our patient can realize, through the love of a friend or counselor, that God loves Him, this love will help compensate for the hate in his life.

Just as God uses human instruments in curing physical illness, He uses men in curing mental disease. In curing mental illness, God's instruments may include a minister, a psychiatrist, and even a mental hospital. But one must co-operate with God's instruments of healing. One must work with his counselors and help them use God's law of healing.

The healing of a mental illness does not come with the snap of a psychiatrist's finger. It often requires months, even years, for recovery, just as it may have taken a long time building up. Throughout all the healing processes taking place, I believe God is at work. I am only God's tool.

Mr. Hefley: Would you tell some

of your observations concerning the role of the minister in mental healing?

Dr. Busby: At Lutheran General Hospital, we have an excellent working relationship with the ministers. We sponsor a pastor's seminar each week for ministers of the area. We give lectures to them. We have some helpful group discussions during which we discuss specific cases with them. As a practicing psychiatrist, I have functioned in all these areas at the hospital.

The hospital has a full-time chaplain. In the psychiatric department, we believe the minister's job is similar to our own. Of course, we co-operate with the ministers of patients who visit in the department.

In my private practice, I work closely with pastors. About half my patients are minister-referred. I try to talk to a minister after I have seen his patient, and if it is someone he can take care of, my phone is open for him to call for advice. Quite frequently I eat lunch with local ministers. This informal fellowship helps us better to understand our roles in counseling.

Mr. Hefley: What contribution

can the minister or Christian worker make that a psychiatrist cannot make?

Dr. Busby: The minister has the image of being a man of God. He has a unique message in the Gospel of Christ. He can speak from spiritual authority with the backing of a "thus saith the Lord." Some ministers, I believe, have unwisely stepped outside their bounds to become amateur psychiatrists, not having special training. Persons who are mentally ill need the distinct message of the Gospel, and they can get it best from their ministers.

Mr. Hefley: Do you try to give spiritual help during your consultations?

Dr. Busby: In my work it is difficult to distinguish between what is spiritual and what is nonspiritual. I do use the Bible. I do pray with patients. I have been used by God to lead some of my patients to faith in Christ as Savior. But let me hasten to say that I do not think psychiatry is a gimmick for personal evangelism. Much more is involved. Many of my patients are already Christians. They need help to become mature Christians.

"The New Faces Inside the . . . Atom Compel Me to Believe in God."

Argonne National Laboratory is the Atomic Energy Commission's atomic research installation near Chicago. Dr. John H. Martin is an associate physicist at Argonne and one of the developers of a revolutionary new fifty-million-dollar atom smasher.

Dr. Martin earned his Ph.D. degree in physics from Washington University, St. Louis, in 1949. He taught for four years at Forman Christian College, Lahore, West Pakistan, before coming to Argonne as a research physicist.

Mr. Hefley: Dr. Martin, you were quoted by the *Chicago Tribune* as saying that the structure of the atom's nucleus "forces you to believe in God." Would you explain that statement?

Dr. Martin: Perhaps it would be better to say that the new forces inside the nucleus of the atom compel me to believe in a Supreme Being.

Mr. Hefley: You and your colleagues at this laboratory are counted among the world's foremost scientists. Would you call yourself and your co-workers men of faith?

Dr. Martin: Every scientist operates on the principles of faith. We assume by faith that natural law is not fickle. For example, when we repeat an experiment we expect to receive identical results. If we do not, we assume that we made a mistake in the second experiment. We believe that nature is not fickle.

Mr. Hefley: What about one's faith in God?

Dr. Martin: That would depend upon one's definition of God. Not every scientist believes in our Christian concept of God. But I have never encountered a scientist who did not believe in some sort of higher power or force. In physics especially the student is compelled to believe in God. At least I am.

For example, consider the new forces that have been discovered through recent explorations of the atom's nucleus. They represent a seemingly new order of physical law, but a law that is orderly. For example, they cannot be explained

by our traditional laws of gravity, magnetism, and electrostatic attraction. The more deeply we delve into the mysteries of the atom the more imponderable these forces become. But the knowledge we have discovered has proved that they act and react in an orderly manner. It is this consistency in order that forces me to believe in a Divine Planner.

Mr. Hefley: Are you saying that the world of the atom is different from our world?

Dr. Martin: Precisely. Things occur within the nucleus of the atom that simply do not make sense as we know it. We have found that an electron can be made to go through two different places at once. This is impossible in our familiar world. I know that my boy playing baseball cannot bat a fly into both right and left fields at the same time.

Mr. Hefley: What does a scientist do when he meets the "unreasonable"?

Dr. Martin: We really become excited. We know that a new discovery is in the offing or that some of our accepted ideas are about to be proved wrong. We always assume, however, that it is our understanding that is at fault, never that nature has tricked us. Sometimes we call such an event a breakthrough.

Mr. Hefley: Could you cite an example of such a breakthrough?

Dr. Martin: Such an event occurred in 1939 when two German physicists discovered nuclear fission. The process released a phenomenal quantity of energy and revealed a new mechanism in physics. Two years later a self-sustained

nuclear reaction of this type was produced, which led to the production of useful atomic energy and to the atomic bomb. That event in 1941 occurred in the Metallurgical Laboratory, which was subsequently reorganized into Argonne.

Mr. Hefley: You said that part of the secrets of the atom were discovered in 1939. What other atomic secrets have since been discovered?

Dr. Martin: We know now that submicroscopic units, called fundamental particles, exist within the nucleus of the atom. These must be included with the neutron and proton—the two major building blocks of the atom. And atoms are so small that the ink in an ordinary period contains more atoms than there are persons in the world.

Some of the fundamental particles live only for fractions of a millionth of a second. Some are called antiparticles and have the property of annihilating their partners in the form of ordinary particles.

Mr. Hefley: How many different kinds of these particles have been discovered?

Dr. Martin: About thirty. They have been given such eerie names as *sigma particles*, *lambda particles*, *pi mesons*, *mu mesons*, and *antineutrino*. Some of them carry negative electric charges; some positive charges; and some are neutral. Yet we have to invoke more than the conventional laws of physics to describe their properties. And we have found that tremendous energy is required to pry out their secrets.

To release the power binding the

neutron and proton inside the atom requires several million electron volts. But to take a neutron or proton apart and get into the world of the stronger particles requires several billion electron volts. The big synchrotron which we are building now will generate nuclear bullets with energies of 12.5 billion electron volts. Inside the synchrotron we hope to produce all thirty of the subatomic particles. We expect the synchrotron to drive the nuclear bullets, protons, on a circular course to nearly the speed of light. During one second in the synchrotron, those bullets will travel a distance more than half way from here to the moon.

Mr. Hefley: Do you understand all of these vast quantities and distances you talk about?

Dr. Martin: No. We find ourselves out on a sea of natural laws. The farther we look, the poorer our understanding becomes. Whether we look at tiny things or huge things we find our understanding decreasing with the use of scaling factors. Regardless of how far we go we find ourselves standing on the edge of the unknown. This instills in me a constant feeling of both reverence and humility.

Mr. Hefley: By reverence, do you mean that you stand in awe at the work of the Creator?

Dr. Martin: Yes. My respect and admiration of God's handiwork grows with every passing day I spend in this lab.

Mr. Hefley: Do you think that the experiments of Communist scientists may lead them to faith in God?

Dr. Martin: I think more scientific education will lead even Communists to belief in a higher power—perhaps not our Judeo-Christian concept of God, but to a lawgiver.

Mr. Hefley: What is your answer to the Russian cosmonaut Titov? He claimed he could not find God on his trip into space.

Dr. Martin: What did he expect God to look like—a picture, a ball of fire? That is to say that God has a purely physical existence.

Mr. Hefley: You said that your study of physics has led you into stronger faith in God. What is the connection between your faith and your latest statement?

Dr. Martin: In our physical universe we can observe the results of the Designer and Planner. We find His trail. But we cannot define and prove His existence by mechanical laws. We have to use a different set of laws in understanding God; and that is perfectly consistent with what we have found inside the atom—we have to use a different set of laws in studying the particles.

Mr. Hefley: What set of laws would you use to prove the existence of a personal God—one who cares for you?

Dr. Martin: I dislike the term *proof*. To modern man it implies an equation, a formula, an experiment. I do not believe God is made up of atoms and molecules. If we show God to be personal, we must deal with personal things and personal relationships. I have often asked a doubter, "How do you know beauty exists? How are you sure there is such a thing as love?"

Redemptive love, to me, is the

central force of our Christian faith. When I taught in Pakistan, I asked a Moslem student to report on what the Koran taught about love. He reported that all he could find was the statement, "God is love." Real Christianity, in both New Testament times and today, is love in action. That is the greatest proof of God a Christian can show to the world.

The Bible says that God created man in His own image. It seems to me that we have yet a long way to go and that this process of creation is still going on. We are growing and changing in various ways, such as physical height, mental capacity, attitudes. By the laws of evolution, we are told that the fittest survive. I believe that is true and is a part of the creative process. This seems to apply to nations and groups of various sorts. In all cases, however, these groups are made up of individual members. A nation can never be stronger than the citizens of which it is composed. If God is creating man in His own image and if He wishes this creation to survive, He must have a concern for the whole of the individual man in a very personal way. This process seems to involve God's attempt at teaching His laws, allowing us the free will to accept or reject these teachings. Otherwise we would not be free persons, but automatons. We greatly need to learn today the practice of Christian love. If we evolve to accept it, we shall survive. If we reject it as individual persons, our survival is much in doubt.

Mr. Hefley: Dr. Martin, some

persons say that the Christian faith is a relic of the past and that modern science has no need for God.

Dr. Martin: I have heard a few prejudiced persons say that the Church does not offer them a thing. They are criticizing what they do not know and have not experienced.

Mr. Hefley: Do you believe, then, that in your life, for example, it is necessary for you to have the right relationship with a personal God?

Dr. Martin: Yes. I could not function as a scientist without being a stable human being. And one is not complete until he has an acceptable relationship with his Creator. Right relationships with God produce wholesome relationships with one's co-workers. As a scientist I must have emotional stability. My purpose for living must go beyond purely material goals. I must respect and honor my colleagues. Take the spiritual ingredients out of our lives here in this lab, and we could not function together as a working team.

Mr. Hefley: Do you and your colleagues talk often about spiritual things?

Dr. Martin: You would be amazed at some of the conversations we have during lunch hours. Yes, we do discuss matters of faith and religion among ourselves. We scientists are vitally interested in what is beyond our limited capacities of understanding.

Mr. Hefley: Do you mean that scientists are spiritually hungry?

Dr. Martin: Quite so. We realize that a spiritual void exists in our lives, which, I believe, only God can fill.

Mr. Hefley: Are Christian leaders getting through to scientists with the message of Christ?

Dr. Martin: In most instances, I think not.

Mr. Hefley: Why?

Dr. Martin: It is a matter of communication. Often I get the idea that some theologians do not understand what they are talking about. The message is not at fault, but new words must be substituted for old cliches. Scientists are critical of religious double talk.

Mr. Hefley: Would you express your opinion of the morality of nuclear power?

Dr. Martin: First, I think that nuclear power is neither moral nor immoral. It is neutral. It is a tool in the hands of men. Going further, it is a stewardship of responsibility. Responsibility is a word the Church uses. Nuclear power can produce significant good or horrible evil, depending upon who uses it and how it is used. That is true in other areas of life. God has entrusted me with four children. My wife and I can make criminals of them if we so choose. Nuclear power can be used for great destruction if man so chooses. The responsibility is upon man, and great will be the judgment if he fails. This is just one more compelling reason why every scientist needs to be on personal terms with God.

Mr. Hefley: You have some strong convictions. I can tell that you do not park your religion outside when you come into the lab.

Dr. Martin: I see no reason to do so. Real religion permeates the whole of one's life.

America's Space Flight Program

A key man in America's space program is Walter F. Burke, general manager of Project Mercury and Gemini, and vice-president of McDonnell Aircraft Corporation in St. Louis. Mr. Burke, and the fifteen hundred technicians and scientists under his supervision, are charged with the designing, developing, building, firing, and launching of the Mercury and Gemini space capsules.

Mr. Burke is a native of Boston and holds science degrees from the Massachusetts Institute of Technology and the University of Michigan, where he taught courses in aeronautical science for four years. Before joining the McDonnell Corporation he worked for five years with the National Advisory Committee for Aeronautics, which is today the National Aeronautics and Space Administration.

Mr. Hefley: Mr. Burke, what is the next big step in America's space flight program?

Mr. Burke: After Mercury comes Project Gemini, a two-man spacecraft, capable of extended periods of time in orbital flight. Early in the program for Project Gemini will come the significant step of joining or rendezvous in orbital flight of a Gemini spacecraft with an orbiting target vehicle. That will be the forerunner of the "space trains" of the future for interplanetary travel.

This normal progression of events will pave the way for a manned landing on the moon, which is planned to take place in the decade of the sixties.

This is man's plan. It must be God's will, however, and done to His glory to succeed. We beseech His help.

Mr. Hefley: As a boy, did you ever dream that these fantastic space exploits would take place?

Mr. Burke: I have always been interested in flying. I started making model planes at age nine or ten. But I never dreamed we would go this far in my lifetime. For me and the men who work with me, the past few years have brought one thrill after another.

Mr. Hefley: What has been your greatest thrill in the space effort to date?

Mr. Burke: That is difficult to answer. Each one seems more exciting than the former. But I think the shot that put Alan Shepard into space gave me my greatest thrill. I was on the pad at the Cape that day and with millions of others was praying for Al as he

was blasted off. There was not a dry eye around me. My wife Pat was on the beach nearby, and she gives the same report. When Gus Grissom repeated that success a few months later, millions of persons all over the world gave thanks to God for those courageous Americans. John Glenn's orbital flight provided a mighty climax for Project Mercury, and its successful repetition by Scott Carpenter and Gordon Cooper made all of us extremely proud of these great Americans of the space age.

Mr. Hefley: John Glenn gave a solid Christian testimony. Can you tell what impact that has had?

Mr. Burke: Glenn's testimony certainly has had effect among teen-agers. My daughter Patti is sixteen and a high-school senior. She and her friends are much aware that Colonel Glenn is a Christian family man. I think it has made them more willing to speak out for their Christian faith.

Mr. Hefley: I have heard that you are a student of the Bible as well as space exploration. Have you found anything in the Bible that forbids man to go into space?

Mr. Burke: I have found nothing that leads me to believe we are working contrary to the will of God. I know there are persons who think otherwise. About a month ago, I received a fourteen-page letter from a woman who claims that man is not glorifying God by going into space.

Mr. Hefley: Have you found encouragement in the Bible for space exploration?

Mr. Burke: I think many Biblical principles support space travel.

Jesus said that to whom much is given, of him much is required. Our creative ability comes from God. If we use it with His glory in mind, I see nothing wrong with going to the moon, to Mars, or to any place else in space. Properly motivated Christians can be of great influence in this new field of exploration.

Mr. Hefley: How far has man gone in conquering space?

Mr. Burke: I prefer the term *explore* to *conquer*. Man will never conquer all of space. Just consider the distance to the nearest star. If you had begun traveling at one and one-half million miles per hour at the time of Christ's birth, you still would not have arrived there by today. Consider also John Glenn's flight. His highest altitude was approximately 150 miles. When we consider that our earth is approximately eight thousand miles in diameter, our first orbiting astronaut barely got outside the skin of the earth. Despite all the fantastic developments of our space age, the probability of a man getting outside our own galaxy in a lifetime is extremely small. A spacecraft traveling at the fantastic speed of light, 186,000 miles per second, would require one hundred thousand years to cross our galaxy, the Milky Way. And we know untold numbers of galaxies exist. The distance is simply too great. By distance I mean the product of velocity and time. When we relate this to life expectancy, we readily see that it is impossible for one man to travel very far in God's universe. In other words, man cannot live long

enough to go fast enough to go far enough really to encroach on God's universe. With present knowledge, man is limited to exploring only a tiny part of space.

Mr. Hefley: Do you think man will always be earth-bound?

Mr. Burke: To a large degree, yes. Certainly man may be able to visit the moon or a nearby planet, but much progress must be made before he can stay very long. Our bodies must live in an atmosphere now known to exist only on earth. When man goes outside the earth's atmosphere, he must carry this environment with him or find a way to create it. That will require significant breakthroughs in scientific knowledge.

Mr. Hefley: Do you think there are moral, rational creatures like ourselves living on other planets?

Mr. Burke: I do not think man as we know him can live there. The environments of other planets are hostile to us. But God may have developed other creatures that are able to live in an environment that is hostile to man. We have a good example here on earth. God made it possible for fish to dwell in water, an unfriendly habitat for us. I see no reason why God could not create intelligent life on other planets that is capable of knowing and worshipping God.

No one has proved that no intelligent beings exist on other planets. I rather think it is a selfish approach to say that creatures capable of knowing and having fellowship with the Creator live only on earth. Man as we know him is vain. He likes to think he is the

king of the universe.

Mr. Hefley: There has been a lot of talk about a new religion called scientism that supposedly has developed because of recent scientific discoveries. On the other hand, some persons claim that science is turning many men to faith in God. What is your opinion on this?

Mr. Burke: Personally, I think the space age has done a great deal of good. It has been a factor in the deepening of my own spiritual life. I read the Bible more now. I have gone beyond the philosophical question: Is there a God? Each day I think more of God's purpose for my life and how I can be a better witness for Christ.

In all my associations with scientists, I cannot recall ever meeting a true atheist. And since we have actually got into space, I have detected a deeper faith among my associates. Hardly a day goes by in my work that I do not hear someone speak of spiritual matters. In the past few months, I have sensed a spiritual awakening among space people. They talk more freely now, and some have admitted Christian convictions to me that I never dreamed they held before.

Mr. Hefley: Scientists are not ashamed to speak of their faith, then?

Mr. Burke: Why should we be? I have found nothing in science or space exploration to compel me to throw away my Bible or to reject my Savior, Jesus Christ, in whom I trust.

Mr. Hefley: What do you get from your faith, from the Bible, that you cannot get from science?

Mr. Burke: Many things—the really important things of life. Through Christ I know that my sins are forgiven. I have the assurance that I shall live with Him in Heaven after I die. My faith gives me the strength and wisdom to live each day. And, really, how I can better live for Christ is of more concern to me than being on a team that is striving to reach the moon.

Mr. Hefley: You mention your belief in Heaven. Has your concept of Heaven changed since man's flight into space?

Mr. Burke: No, I do not think so. I have always believed that Heaven is a spiritual place and cannot be explained from a purely mechanical or flesh-and-blood point of view.

Mr. Hefley: Tell me about yourself and your church activities.

Mr. Burke: There is not much to tell. I am a layman. My wife Pat and I both teach Sunday school. Pat teaches eighth graders, and I teach ninth graders at our church.

Mr. Hefley: Do you encourage your young people to become scientists?

Mr. Burke: Yes, at every opportunity I get. Scientists who are Christians will strive to glorify God through scientific discoveries. If we leave science to non-Christians, then just the opposite is likely to occur. I find that young people in my church are very alert and extremely interested in science.

Mr. Hefley: I understand that you directed a Bible study in your church during the month Colonel Glenn was shot into orbit.

Mr. Burke: Yes; February, 1962, was a hectic month for me. I was serving as Sunday school superintendent then. We had planned for some time to make February a Bible study month in our church. Colonel Glenn's orbit was postponed, as you recall, several times. Thus it happened that the shot came when we were in the midst of the Bible study. On Tuesday I was at Cape Canaveral when the orbital shot was fired. Then I flew back to St. Louis and directed the Bible study on the following Wednesday night.

Mr. Hefley: Did the Bible study come off as well as the orbital flight?

Mr. Burke: With the help of God, we had a good Bible study month, with excellent attendance. It enriched the spiritual life of our church, and those who took part are anxious to repeat that experience.

Mr. Hefley: I have one more

question—one that I have asked other scientists. How can the church communicate the Christian message to scientists?

Mr. Burke: That is not an easy question to answer. I think the church should not think of scientists as creatures distinct from farmers and businessmen. Scientists are normal human beings. They, too, need redemption. They recognize the existence of law and order in the universe. They understand that there is a divine law. They can see that man by himself is unable to live up to this law. For me, that clearly shows how great is the love of God that He should send His only Son to die on the cross for my sins against Him. Jesus died to make it possible for all lawbreakers of all time to come into fellowship with God. This, I think, is the message the Church must communicate to scientists, and to all persons, for that matter.

No Reason to Give up Either the Bible or Science

Dr. Robert Fischer is director of laboratories and associate professor of chemistry at Indiana University. An analytical chemist, Dr. Fischer is noted for his experiments and studies with the electron microscope.

Dr. Fischer holds the Bachelor of Science degree from Wheaton College and the Ph.D. degree from the University of Illinois. He served as a science instructor at the University of Illinois, and since 1948 he has been on the faculty of Indiana University.

Mr. Hefley: Dr. Fischer, in previous discussions with Christian scientists, we have talked about certain alleged conflicts between Christian faith and science. Are you aware of any conflicts?

Dr. Fischer: Yes. I would say there are points at which some scientists and some church leaders disagree. The age of the earth is one point. The length of time man has been on earth is another. And I frequently hear about certain so-called contradictions in the Bible.

Mr. Hefley: How do you suggest these problems be approached?

Dr. Fischer: I think three valid approaches should be considered by both groups.

First, we should re-examine the evidence. Christians should take a closer look at the Creation story in Genesis. The word for *day* is the Hebrew *yom*, which may mean several different things, including a period of time. The Bible simply does not say that the earth is six thousand years old, nor that it was created in six twenty-four-hour days.

Another illustration is the inscription concerning Christ that was posted on the cross. Critics of the Bible say the Gospel accounts contradict one another. The Gospel records do differ, but the critics should consider that each quotation might have been part of the whole inscription.

Second, we should gather additional evidence. To get a more complete record of the kings of Israel we should examine the prophetic and poetic books, many of which were written in the times of the kings. To learn more about

Old Testament sacrifices we should study the New Testament. In addition, we should consider the evidence that the Dead Sea Scrolls and other archaeological findings have to offer. For example, in studying the minute particles found in chemical compounds, chemists used to observe apparent contradictions with well-founded formulas and laws. But now that we have the electron microscope, we have been able to account for earlier so-called discrepancies.

For hundreds of years scientists quibbled over whether light is composed of matter or energy. Recent discoveries have shown that light is composed of both. Additional evidence helped clarify this conflict.

Third, if there is not enough evidence on which to base decisions, we should suspend judgment. Nothing is wrong with saying, "I do not know," or, "I am not sure." We say that often in the laboratory. An example is the problem of the age of man. The Bible seems to say that man has not been here so long as some scientists claim he has. The Bible does not give a complete history or listing of every generation, therefore no one can speak dogmatically on this point. I, for one, am willing to wait. And while I wait I see no reason to give up either the Bible or science.

Mr. Hefley: Do you think, then, that both the Church and science should learn to give a little on matters in dispute?

Dr. Fischer: Yes. Why not? I do not have a complete understanding of the Bible. Yet this does not keep me from believing that the

7 original Scriptures were inspired without error. And, if I may step out of my realm a moment, I think that the approach of suspending judgment can be applied in theological disputes between branches of the Church. Calvinists stress predestination of the believer. Armenians emphasize free will. I am sure there is a lot more for us to understand about those subjects. The same may be said for prophetic events. We know a lot about Heaven and eternity, but many details we do not know. Until we have better understanding, let us be tolerant of views that differ from our own.

Mr. Hefley: Apparently you are a student of the Bible as well as of science. Would you care to compare the Biblical revelation with the natural revelation?

Dr. Fischer: I am glad you mentioned two revelations—Biblical and natural. They should be considered separate, although they complement each other. The Biblical revelation is spiritual and is intended to meet our spiritual needs. The scientist outside of Christ is spiritually dead and does not respond to God. When he receives the revelation of the Gospel and believes in Christ he becomes spiritually alive. So far as this purpose goes, the Biblical revelation is complete. In other areas, however, it is incomplete.

Mr. Hefley: What do you mean, "incomplete"?

Dr. Fischer: The Bible does not go into detail and name every created thing—only the most obvious: vegetation, water life, land life. Through the various fields of sci-

ence we study in detail the natural creation. In that way we fulfill the intent of Scripture.

Mr. Hefley: Do you refer to Genesis 1:28, where God says, "Have dominion"?

Dr. Fischer: Yes. Also the New Testament teaches that we are to help meet the needs of others. The products of science are a legitimate concern for God's people. Those products should be used to benefit mankind. We are constantly expanding our knowledge of the natural creation for the good of mankind.

Mr. Hefley: What are some of the recent advances in chemistry?

Dr. Fischer: Chemistry has been in the forefront in helping to increase our standard of living. Almost everything we eat and wear has come from chemistry. One recent development concerns barium sulphate, which one drinks before taking X rays. The electron microscope has shown us more of the particles that determine solubility. Those particles are so small that they were completely missed before. Now we are able to produce barium sulphate that makes X rays much more distinct.

The electron microscope has also increased our understanding of nucleation. Nucleation has to do with the formations of particles as they go from a gas to a liquid or to a solid. This has increased our knowledge of the phenomenon of rain making. Thus rain makers can do a better job.

Another example is electroplating. Successes in chemistry have made possible brighter and more durable electrodeposits. The

chrome on new cars and on kitchenware is brighter because of this.

We have also developed better pigments from which more durable and lasting paint is produced. Many other recent developments originated in our chemistry labs.

Mr. Hefley: You have been talking about the electron microscope. How does it work?

Dr. Fischer: It works on the same principle as the ordinary light microscope except that we use electrons instead of a beam of light. This permits higher magnification for studying structural details.

Mr. Hefley: Can you prove God through instruments such as the electron microscope?

Dr. Fischer: No. Chemistry deals with the natural realm and with the compositions of substances and the transformations which they undergo. Let me hasten to say that I am not disappointed about not being able to prove God. God is supernatural. I expect Him to be so.

Mr. Hefley: Have you, as one scientist said, seen God's trail in nature?

Dr. Fischer: I presume you refer to design. Abundant evidence reveals design in the natural creation. Sodium chloride, for example, chemically contains a regular geometric arrangement of sodium and chloride ions stacked in three dimensions. In a cornfield one may observe two dimensional order in the rows of stalks. We know that the ground was plowed and planted in neat rows by the farmer. In sodium chloride we find three dimensional order. We may

assume that the Master Designer or Creator made it so.

Mr. Hefley: Is that same order and design true for other compounds?

Dr. Fischer: Yes.

Mr. Hefley: Then why cannot more persons—especially scientists—see that and become concerned about spiritual matters?

Dr. Fischer: Let me answer this way. In the natural realm we each have five senses—taste, touch, smell, sight, and hearing. When one truly believes in Christ as Savior he gains a kind of sixth sense—spiritual discernment. The natural man, who is without Christ, does not have this sense of spiritual understanding and appreciation. I Corinthians 2: 14 is a good Scripture reference for this point.

Mr. Hefley: Evidently you consider evangelism important.

Dr. Fischer: I do. Giving natural man the Gospel is more important than giving him the benefits of science. But in our age, why should not the Church give both?

Mr. Hefley: Do you mean that the Church should make science its servant?

Dr. Fischer: I do not mean that scientists should be directed by church leaders. There was too much of that during the Dark Ages: ecclesiastical leaders held science back. And, by the way, the resurgence of science was in part a product of the Protestant Reformation. I mean that the Church should use the benefits of science in its ministry.

Mr. Hefley: Please indicate how.

Dr. Fischer: Medical missionaries can use medicines, which are

the products of chemistry. So can agricultural missionaries use the products of chemistry. Chemistry gives the Church tools with which to work, and they can be used for good or bad.

Mr. Hefley: Then we Christians should have a strong interest in science.

Dr. Fischer: Yes, indeed. Science is not the enemy of the Church. More harmony between science and the Church can result only in good for mankind.

Mr. Hefley: Apart from the products of science, can the Church benefit in other ways from scientists—specifically from Christian scientists?

Dr. Fischer: I do not intend to be presumptuous when I say yes. I believe we scientists have something to offer the Church.

Mr. Hefley: What, for instance?

Dr. Fischer: We can challenge the Church to go to sources for knowledge. A famous preacher may say something that his lis-

teners will believe beyond dispute just because he said it. Science has repeatedly challenged human authority. Many times so-called scientific facts were proved to be wrong when more knowledge was discovered. In the area of faith, that is precisely what Luther and the Reformers did when they called for a return to the authority of the Bible instead of relying upon mere tradition.

In our experiments here we cannot afford to stop with superficial observations. We must dig deeply to unlock the secrets of the Creation. We must be constantly challenging yesterday's knowledge. We must keep moving forward.

Mr. Hefley: You are optimistic about the future of science, are you not?

Dr. Fischer: Yes, if science is used for the good of man and the glory of God. This is a scientific age. If we Christians are to serve as God's ambassadors, we must be up to date.

Science Is Not, Like God, Omnipotent

Dr. Irving W. Knobloch has been a professor in the Department of Botany, Michigan State University, since 1945.

Dr. Knobloch holds graduate degrees from the University of Buffalo and Iowa State University. He is a specialist in cytology, morphology, and agrostology. He is the author of articles in both scientific and religious journals and is listed in "Who's Who in America." He was editor of "Readings in Biological Science," a popular supplementary text for college biology classes; and he was co-editor of "Ferns and Fern Allies" of Chihuahua, Mexico. He contributed to "Evolution and Christian Thought Today," a symposium.

Dr. Knobloch is also an active member of the American Scientific Affiliation.

Mr. Hefley: Speaking as a Christian and a scientist, Doctor, what would you say are the limitations of science?

Dr. Knobloch: Science deals only with the observable and the measurable. Science is concerned with the improvement of its theories and seeks to find reality and truth. But science is not, like God, omnipotent. It cannot account for nor explain everything. Science cannot, for example, prove nor disprove that God exists. Other religious subjects, such as the plan of redemption, the Incarnation, and eternal life, fall outside the realm of science.

Science cannot explain the origin of the universe solely by chance. It cannot prove nor explain that atoms and molecules came together by chance to form life. Science, then, as Christianity, requires a certain amount of faith.

Mr. Hefley: Is this, then, a common ground on which science and Christianity stand?

Dr. Knobloch: Yes. Science must believe in its authorities, its instruments. Of course, by experimentation we scientists can check up on our beliefs. We are continually focusing self-criticism upon yesterday's discoveries.

I am a Christian by faith. I believe some things I do not understand and cannot explain, but they work when applied to my life.

Mr. Hefley: From your associations, do you think scientists are becoming more reverent toward God?

Dr. Knobloch: That is difficult to judge. Scientists are men, just as ordinary laymen. There are as

many kinds of scientists as there are other kinds of laymen. I refer to atheistic scientists, agnostic scientists, devout scientists. My observation is that scientists are not more inclined to atheism than are men on the street.

Nothing intrinsic in science will lead one into atheism. There is no evil in proper scientific experiments. The evil comes when the wrong thing is done with the results. Many neutral scientists have been led into faith, however, by observing the wonders of the universe, and some may have been strengthened in their unbelief.

Mr. Hefley: Dr. Knobloch, we hear much these days about alleged conflicts between science and faith. Please state your views, particularly in the field of evolution. Can one be a Christian and believe in evolution?

Dr. Knobloch: The question you ask is the one most frequently asked me in private conversation with college students. In their churches, some of them have been told that they cannot so believe.

Both scientists and Christians should be concerned about what can be proved and what cannot be proved. I think first I should define the term *evolution*. Webster defines it as "an unfolding; a process of opening out; a development as leading to a definite end." Biologically, evolution refers to "the development of a race, species, or other groups." Let me now attempt to define three current views of how our biological world came to be what it is now.

1. Materialistic evolution teaches evolution by chance with-

out the divine fiat as the originating source. According to this view, things just happened.

2. Special creation means to many persons that God created everything in six twenty-four-hour days.

3. Creational evolution is the view that God created the substance of the universe, some forms of life, and set up natural laws which allowed evolution of the various forms of life out of the original substances. There are several concepts within this view. One idea is that God created certain kinds (see Genesis 1: 21-25) of plant and animal life and that from these kinds evolved or developed plant or animal species as we observe them today. I believe this view does not conflict with a close reading of Genesis.

The problem usually involves the interpretation of what *kind* means. The Bible does not say. Some persons have assumed that it refers to species. It may refer to phylum, class, or order, which are primary divisions of the plant and animal kingdoms.

Mr. Hefley: Have the various forms of life remained within their phyla since the beginning?

Dr. Knobloch: The evidence does not show any natural crossing between members of separate phyla or classes. For example, the plant kingdom is divided by botanists into four great groups or phyla: (1) thallophyta (algae, fungi, and bacteria); (2) bryophyta (liverworts and mosses); (3) pteridophyta (ferns, horse-tails, and club mosses); (4) spermatophyta (seed-bearing

plants). These phyla or classes may well be the kinds of plant or vegetable life that God originally created.

Within these phyla are numerous examples of evolution—call it development if you wish. One example is wheat, of which we have many varieties today. Wheat may not have existed at the time of original creation. It is a member of the spermatophyta phylum and could have been originally a seaweed. Geological evidence has shown that there have been many changes in the lower groups and orders of life. If we choose to call this evolution, then evolution is a fact. To go a step further, I see no reason why one cannot be a Christian and believe in this type of evolution.

The conflict between science and Christianity lies not in the facts as known in science and given in the Bible but in the interpretations given. A scientist sees evidence of chance development and hybridization or crossing between certain species and interprets that to mean that all life has evolved by chance. A Christian interprets the term *evolution* to mean the development of all life by chance. This logic moves him, then, to declare all evolutionists to be wicked atheists.

I say firmly that not all so-called evolutionists are atheists, although I grant you that some evolutionists are atheists.

Mr. Hefley: Do you think that Christians have erred in making evolution and Christianity an either/or proposition?

Dr. Knobloch: I do. I believe that science has proved certain

forms of evolution or development within certain groups or orders of life. I believe this does not conflict with the Biblical account of creation. From private conversations with puzzled students, I know that a lot of heartbreak and tragedy could be avoided if that were better understood.

Mr. Hefley: Are ministers too dogmatic in this area?

Dr. Knobloch: I think some of them are. A minister should be dogmatic only about what he knows to be factual. No one can be dogmatic about creation. Concerning interpretation, one should not proclaim his own views or the views of a group as being divine revelation. The same is true for scientists. We should not present as fact that which cannot be proved.

Mr. Hefley: To summarize, then, you say there are three main views on how life came to be what it is now: materialistic evolution; special creation; and creational evolution.

Dr. Knobloch: That is correct, although creational evolution involves belief in special creation.

Mr. Hefley: I take it that you believe creational evolution is the area of middle ground.

Dr. Knobloch: For me it is. Perhaps *creational development* may be the better way to say it, however. *Evolution* is a fighting word to many persons. Someone may come to you and ask, "Are you a Republican or a Democrat?" If you reply, "Neither," they look at you as if you are crazy. In this alleged debate between special creation and materialistic evolution, I am a

neither. My observations in the biological sciences have demonstrated to me that there has been development or evolution among various forms of life. My faith in the Bible enables me to believe that life did not come about by pure chance. I believe that behind this universe is an intelligent, personal God, one in whom I can believe and with whom I can have fellowship.

Mr. Hefley: In your view, Doctor, what does a Christian have that an unbeliever does not have?

Dr. Knobloch: A mechanist—that is what I choose to call someone who believes things just happened—cannot assess any real meaning in the formation of life, its continuance, its ultimate goal. He has nothing to live for except solving day-by-day problems and making the world a better place in which to live. These are laudable efforts and goals, but they are limited to a this-life perspective only.

A Christian sees a further purpose in life. He has hope and faith in the afterlife. Real meaning is put into his life, because he believes he is an eternal being.

Mr. Hefley: Do Christians—do you—ever doubt the things accepted by faith?

Dr. Knobloch: Yes. I think all Christians doubt at one time or another. If we knew a reason for everything and understood everything, we would be gods would we not?

We must simply accept many things on faith which cannot be proved and go on from there. The real test of a scientific experiment is whether it works. The real test of one's Christian faith is whether

it works. The greatest proof of Christianity to me is not what I have observed in my years of teaching and study, but it is the

Christlike life I have seen in other Christians and the indwelling Christ at work in my own life.

Tullick - God is above Personality.